

Appendix E. Analytical Methods and
Reporting Limits

Table E-1**Methods and RL goals for PCB Aroclors, PAHS, metals, SVOCs, and conventionals in sediment/soil**

Analyte	Method	Unit	MDL	RL
PCBs as Aroclors (based on 12.5-g dw sample)				
Aroclor 1016	EPA 8082A	µg/kg dw	1.6 ¹	4.0 ²
Aroclor 1221	EPA 8082A	µg/kg dw	1.6 ¹	4.0 ²
Aroclor 1232	EPA 8082A	µg/kg dw	1.6 ¹	4.0 ²
Aroclor 1242	EPA 8082A	µg/kg dw	1.6 ¹	4.0 ²
Aroclor 1248	EPA 8082A	µg/kg dw	1.6 ¹	4.0 ²
Aroclor 1254	EPA 8082A	µg/kg dw	1.6 ¹	4.0 ²
Aroclor 1260	EPA 8082A	µg/kg dw	1.6 ¹	4.0 ²
PAHs (based on 10-g dw sample)				
Acenaphthene ³	EPA 8270E	µg/kg dw	5.13 ¹	20.0 ²
Acenaphthylene ³	EPA 8270E	µg/kg dw	4.77 ¹	20.0 ²
Anthracened	EPA 8270E	µg/kg dw	5.93 ¹	20.0 ²
Benzo(a)anthracene ⁴	EPA 8270E	µg/kg dw	5.18 ¹	20.0 ²
Benzo(a)pyrene ⁴	EPA 8270E	µg/kg dw	6.48 ¹	20.0 ²
Benzo(b)fluoranthene ⁴	EPA 8270E	µg/kg dw	7.02 ¹	20.0 ²
Benzo(k)fluoranthene ⁴	EPA 8270E	µg/kg dw	5.01 ¹	20.0 ²
Total benzofluoranthenes ⁴	EPA 8270E	µg/kg dw	10.2 ¹	40.0 ²
Benzo(g,h,i)perylene ⁴	EPA 8270E	µg/kg dw	5.82 ¹	20.0 ²
Chrysene ⁴	EPA 8270E	µg/kg dw	5.22 ¹	20.0 ²

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Analyte	Method	Unit	MDL	RL
Dibenzo(a,h)anthracene ⁴	EPA 8270E	µg/kg dw	6.16 ¹	20.0 ²
Fluoranthene ⁴	EPA 8270E	µg/kg dw	4.52 ¹	20.0 ²
Fluorene ³	EPA 8270E	µg/kg dw	4.95 ¹	20.0 ²
Indeno(1,2,3-cd)pyrene ⁴	EPA 8270E	µg/kg dw	5.99 ¹	20.0 ²
2-methylnaphthalene ³	EPA 8270E	µg/kg dw	5.67 ¹	20.0 ²
Naphthalene ³	EPA 8270E	µg/kg dw	5.25 ¹	20.0 ²
Phenanthrene ³	EPA 8270E	µg/kg dw	4.69 ¹	20.0 ²
Pyrene ⁴	EPA 8270E	µg/kg dw	5.55 ¹	20.0 ²
Metals (based on 1-g ww unless otherwise noted)				
Arsenic	EPA 6020A UCT-KED	mg/kg dw	na ⁵	0.2 ²
Cadmium	EPA 6020A UCT-KED	mg/kg dw	na ⁵	0.1 ²
Chromium	EPA 6020A	mg/kg dw	na ⁵	0.5 ²
Copper	EPA 6020A UCT-KED	mg/kg dw	na ⁵	0.5 ²
Lead	EPA 6020A	mg/kg dw	na ⁵	0.1 ²
Silver	EPA 6020A	mg/kg dw	na ⁵	0.2 ²
Zinc	EPA 6020A UCT-KED	mg/kg dw	na ⁵	4 ²
Mercury (based on 0.2-g ww sample)	EPA 7471B	mg/kg dw	na ⁵	0.025 ²
SVOCs (based on 10-g dw sample)				
2,4-dimethylphenol	EPA 8270E-SIM	µg/kg dw	2.17	20.0

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Analyte	Method	Unit	MDL	RL
4-methylphenol	EPA 8270E	µg/kg dw	14.7 ¹	20.0 ²
Benzoic acid	EPA 8270E-SIM	µg/kg dw	13.4	100
Benzyl alcohol	EPA 8270E-SIM	µg/kg dw	12.1	20.0
Bis(2-ethylhexyl)phthalate	EPA 8270E	µg/kg dw	28.8 ¹	50.0 ²
Butyl benzyl phthalate	EPA 8270E	µg/kg dw	8.05 ¹	20.0 ²
Dibenzofuran	EPA 8270E	µg/kg dw	4.61 ¹	20.0 ²
Dimethyl phthalate	EPA 8270E	µg/kg dw	6.44 ¹	20.0 ²
Hexachlorobenzene	EPA 8081B	µg/kg dw	0.145	0.5
n-Nitrosodiphenylamine	EPA 8270E-SIM	µg/kg dw	1.31	5.00
Pentachlorophenol	EPA 8270E-SIM	µg/kg dw	2.13	20.0
Phenol	EPA 8270D	µg/kg dw	8.23 ¹	20.0 ²
1,2,4-trichlorobenzene	EPA 8270E-SIM	µg/kg dw	2.68	5.00
1,2-dichlorobenzene	EPA 8270E-SIM	µg/kg dw	0.74	5.00
1,4-dichlorobenzene	EPA 8270E-SIM	µg/kg dw	0.6	5.00
Conventionals				
Grain size	PSEP 1986	%	na	0.1
Percent solids	SM 2540G	% dw	na	0.040
TOC (based on 1-g dw sample)	EPA 9060A	% dw	0.018	0.02
Ammonia	SM 4500-NH3 H-97	mg/kg dw	na	0.4

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Analyte	Method	Unit	MDL	RL
Total sulfides	SM 4500-S2 D-0	mg/kg dw	na	1

Notes:

1. SW 846 no longer requires MDL values. The laboratories have the option to use these values to assess sensitivity for EPA 8000 series methods. ARI has continued to maintain MDL studies for these analytes.
2. RL values are consistent with the LLOQ values required under EPA SW-846.
3. Compound is a component of the LPAH sum.
4. Compound is a component of the HPAH sum.
5. SW 846 no longer requires MDL values.

dw – dry weight

EPA – US Environmental Protection Agency

HPAH – high-molecular-weight polycyclic aromatic hydrocarbon

LLOQ – lower limit of quantitation

MDL – method detection limit

LPAH – low-molecular-weight polycyclic aromatic hydrocarbon

na – not available

PCB – polychlorinated biphenyl

PSEP - Puget Sound Estuary Program

RL – reporting limit

SIM – selective ion monitoring

SVOC – semivolatile organic compounds

TOC – total organic carbon

ww – wet weight

**Table E-2
Method and RL goals for dioxins/furan congeners in sediment**

Analyte	EPA Method 1613B			
	Sediment (ng/kg dw) Based on 10-g sample		TEQ (ng/kg)	
	EDL ¹	LOQ ²	TEF	TEQ ³
2,3,7,8-TCDD	0.05	0.8	1	0.025
1,2,3,7,8-PeCDD	0.05	3.0	1	0.025
1,2,3,4,7,8-HxCDD	0.05	3.0	0.1	0.0025
1,2,3,6,7,8-HxCDD	0.05	3.0	0.1	0.0025
1,2,3,7,8,9-HxCDD	0.05	3.0	0.1	0.0025
1,2,3,4,6,7,8-HpCDD	0.05	3.0	0.01	0.00025
OCDD	0.05	5.0	0.0003	0.0000075
2,3,7,8-TCDF	0.05	0.5	0.1	0.0025
1,2,3,7,8-PeCDF	0.05	3.0	0.03	0.00075
2,3,4,7,8-PeCDF	0.05	3.0	0.3	0.0075
1,2,3,4,7,8-HxCDF	0.05	3.0	0.1	0.0025
1,2,3,6,7,8-HxCDF	0.05	3.0	0.1	0.0025
1,2,3,7,8,9-HxCDF	0.05	3.0	0.1	0.0025
2,3,4,6,7,8-HxCDF	0.05	3.0	0.1	0.0025
1,2,3,4,6,7,8-HpCDF	0.05	3.0	0.01	0.00025
1,2,3,4,7,8,9-HpCDF	0.05	3.0	0.01	0.00025
OCDF	0.05	5.0	0.0003	0.0000075

Notes:

1. EDL is a sample-specific DL. The value provided here is an estimate, and the sample-specific values will vary based on sample mass and the analytical conditions at the time of analysis.
2. LOQ is Axy's lowest concentration, at or above the LMCL, at which test accuracy (precision and bias) has been demonstrated. Values below the LOQ are J-qualified. The reported LOQ will be adjusted based on the sample mass of each sample
3. TEQ calculated using ½ RL value multiplied by the 2005 WHO TEF.

Axy's – Axy's Analytical Services, Ltd.

DL – detection limit

dw – dry weight

EDL – estimated detection limit

EPA – US Environmental Protection Agency

HpCDD – heptachlorodibenzo-p-dioxin

HpCDF – heptachlorodibenzofuran

HxCDD – hexachlorodibenzo-p-dioxin

HxCDF – hexachlorodibenzofuran

LMCL – lower method calibration limit

LOQ – limit of quantitation